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| 37. <i>Impatiens capensis</i> | 46. <i>Galium triflorum</i> |
| 38. <i>Malva rotundifolia</i> | 47. <i>Solidago sempervirens</i> |
| 39. <i>Circaea alpina</i> | 48. <i>Ambrosia artemesiifolia</i>
var. <i>elatior</i> |
| 40. <i>Fraxinus americana</i> | 49. <i>Bidens connata</i> var.
<i>gracilipes</i> |
| 41. <i>F. nigra</i> | 50. <i>B. frondosa</i> |
| 42. <i>Lamium amplexicaule</i> | 51. <i>Arctium tomentosum</i> |
| 43. <i>Lycopus americanus</i> | 52. <i>Taraxacum officinale</i> |
| 44. <i>Campsis radicans</i> | |
| 45. <i>Plantago rugelii</i> | |

THE BULBIFEROUS *RANUNCULUS FICARIA*. — Recent examination of this European species in two localities in the Boston area has shown that in both cases it is represented only by the bulbiferous variety, *Ranunculus ficaria* L. var. *bulbifera* Marsden-Jones. Cytotaxonomic studies carried out in Britain have shown that *Ranunculus ficaria* exists in at least two cytodesmes, the diploid *R. ficaria* var. *ficaria* (*R. ficaria* var. *fertilis* Clapham) ($2n = 16$) and the tetraploid *R. ficaria* var. *bulbifera* ($2n = 32$). They are separable on a number of minor morphological and ecological features (see Marsden-Jones in Jour. Linn. Soc. Lond. Bot. 50: 39. 1935 or D. E. Allen in Proc. Bot. Soc. Brit. Is. 3: 45. 1958, or even van Tieghem in Ann. Sci. Nat. sér. 5, 5:88. 1866 who was naturally unaware of the cytological significance of his observations.) but most significant and noticeable of all is the fact that the tetraploid bears bulbils in the leaf axils and has a very reduced seed fertility whereas the diploid is quite fertile and does not produce bulbils. These bulbils do not become apparent until after the plant has been in flower for a few days when they rapidly enlarge to about the size of a grain of wheat.

The two populations examined this spring, one in the garden of 383 South Street, Jamaica Plain and the other in the Case Estates at Weston, both show the production of abundant bulbils. Cytological examination of both populations was made using acetocarmine squashes of the developing bulbils. This proved to be very favorable material, particularly during early stages of development, at which time a mass of cells near the apex of the bulbil is dividing quite

rapidly. The chromosomes are rather long, however, and better preparations were obtained when the material was pre-treated for three hours in colchicine to shorten the chromosomes, fixed in Carnoy's solution, and softened for 10-15 minutes in 10% HCl.

In both populations examined the bulbils were found to be composed primarily of tetraploid cells ($2n = 32$). However, occasional triploid cells were observed in several bulbils from both populations. A few cells seemed to have a chromosome number intermediate between triploid and tetraploid, but in all cells that could be counted with certainty the somatic number was either 24 or 32. Possibly the cytological situation here is comparable to that observed in tissue cultures in which there is considerable variation in chromosome number. (See Torrey, J. G. in 7th Symposium of Society for the Study of Development and Growth, 189-222. 1959.)

Examination of the pollen revealed that less than 20% of the grains were either abortive or failed to stain normally. The remaining grains stained densely with acetocarmine and appeared normal, except for the fact that the size variation was rather high. It seems unlikely that the plants could be triploid and produce pollen that is over 80% fertile. Triploids have been reported in *Ranunculus ficaria* from areas in which the diploid and tetraploid varieties overlap, but these triploids are characterized by a high percentage of abortive pollen (Neves in Bol. Soc. Brot. ser. 2, 16: 169. 1942, see also 46th (1955), Ann. Rept. John Innes Hort. Inst. 20-21. 1956). The plants in the above populations produced no fertile achenes this spring, but in view of the reasonably high pollen fertility observed it is possible that these plants are outbreeders and appear sterile due to the lack of pollen from a different individual. The populations examined were small and probably consist of a single vegetative clone. It is hoped that cross pollinations and a study of meiotic material next spring will clarify this point.

The specimens of *Ranunculus ficaria* in the Gray Herbarium and the New England Botanical Club Herbarium were next examined and it is significant that whereas several spec-

imens show distinct axillary bulbils, none of the others may be identified with certainty as var. *ficaria*. Those where bulbils were not apparent were all collected early in the flowering season before the end of April when the bulbils would not be seen even on var. *bulbifera*. Every one of the specimens gathered after the beginning of May shows the presence of bulbils.

The examination of other herbaria would no doubt reveal other records and a tour of New England reveal other populations, but the main object of this note is to draw the attention of botanists in N. E. America to the existence of this polyploid and bulbiferous variety. It would also be most interesting to know whether it is only this variety that has been introduced from Europe.

The following are the herbarium records we have seen of var. *bulbifera*. CANADA. QUEBEC: comté de Jacques-Cartier, ville-Lasalle, dans les bruissons le long d'une clôture, 23 May, 1932. *Marie-Victorin & Rolland-Germain 46, 833* (GH). UNITED STATES. MASSACHUSETTS: Middlesex Co., Cambridge, spreading in William Brewster's garden, 8 May 1914, *Walter Deane* (NEBC); Norfolk Co., Milton, wild weed of my garden, 23 June 1923, *N. T. Kidder* (NEBC); Plymouth Co., South Hingham, May 1891, *H. W. Cushing* (GH) and moist soil in garden, transplanted from original locale, 10 May 1947, *C. H. Knowlton* (NEBC); Worcester Co., Lancaster, wild garden of Mrs. N. Thayer, never seen there before, June 1924, *Mrs. J. E. Thayer* (NEBC). PENNSYLVANIA: Philadelphia, "Nurseries", Fairmont Park, 7 May 1910, *H. St. John 111* (GH). (Herbarium specimens of plants that were examined cytologically in this investigation have been deposited in the Gray Herbarium). — PETER S. GREEN AND JOAB L. THOMAS, ARNOLD ARBORETUM, HARVARD UNIVERSITY.

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¹N.N. Davidov and F. Kh. Bakhteyeva, 1960: Botanical Dictionary, Russian-English-German-French-Latin. — Glavnaya Redaktsiya Inostrannykh Nauchno-Tekhnicheskikh Slovaray Fizmatgiza, Leninsky Prospekt 15, Moskow V-71. 1 ruble 16 kop.